Exploring Social, Psychological and Environmental Factors in the Male-Female Risky Driving Behaviors Among College students in Saudi Arabia

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Abstract: Automobile driving for females in Saudi Arabia is a recent phenomenon. Traffic accidents in Saudi Arabia are significantly high compared to many other nations leading to injuries, permanent disabilities, and fatalities. Disparities between males and females in risky driving behaviors have been widely documented. Male-female differences in these risky behaviors and their psychosocial factors in Saudi Arabia have yet to be examined. This study addresses this gap in literature. This study focuses on the risky driving behaviors among fulltime college students represented in a sample of N= 958 students, 808 males and 150 females. Understanding the underlying factors in risky driving behaviors is very important if the aim is to save lives and prevent injuries among this age group (15-34 years old) which represents 36.7 % of the total population of Saudi Arabia. The collected data were analyzed, and results were reported. The results revealed statistically significant male-female differences in risky driving behaviors and road traffic accidents. Psychosocial theories and review of literature were utilized to explain the results. These disparities are not unique to Saudi Arabia but rather represent global trends.

Recommendations and future directions for the improvement of driving behaviors and reducing accidents among the study age group are presented which can in turn help in the improvement of quality of life, reduction of injuries, disabilities and fatalities among this particularly important age group of the Saudi population.

Keywords: risky; behaviors; driving; deviance; self-control; personality disorders

Introduction

Traffic accidents, fatalities and injuries occur at a significant rate both globally and in Saudi Arabia and result in negative social, economic, and human resources consequences. According to the World Health Organization report (2023), road traffic accidents accounted for the death of approximately 1.19 million people annually. The report also concluded that road traffic injuries are the leading cause of death for children and young adults ages 5-29 years. These accidents and injuries cost most countries 3% of their gross domestic income. In addition to the national and global consequences for traffic accidents, individuals and families suffer severe losses as a result of disability, loss of property and loss of income thus adding mental and physical tolls to the dimensions of the problem.

Numerous studies and reports have found that males are 3 times more likely to be killed in road crashes than females (WHO Report, 2023). Several studies (e.g. Oviedo-Trespalacios & Scott-Parker (2018); Sivak (2013) & Tsai and Vaca (2008) agreed that one of the most consistent findings to emerge from the behavioral sciences which is the male-female disparity as it applies to involvement in risky behaviors. Across virtually every study, every society, and every time period where data are available, males engage in risky behaviors at a rate that far exceeds that of females, and, as the behavior becomes more serious and more dangerous, the disparity increases (Ellis, Beaver & Wright 2009). Numerous factors are used to explain male-female differences in offending behaviors, including those that focus on socialization and cultural influences (Walsh, 2011).

Understanding the underlying factors that account for males and females risky driving behaviors and automobile accidents is critical. Once some of these causal factors can be identified, implementing safeguards to reduce risky behaviors become possible and consequently enhancing responsible driving behaviors. Acknowledging the fact that driving behaviors may be influenced by various aspects and multiple factors including individual, psychological, social, economic, environmental and cultural ones, makes it essential to examine as many factors as possible in order

to reach meaningful conclusions and effective strategies to reduce the disastrous consequences of risky driving behaviors. One area that is particularly important to study is the male-female differences in risky driving behaviors. While much of the studies, data and conclusions have been generated from samples outside of the Middle East in general and Saudi Arabia in particular, much less is known about the driving behaviors, especially male-female differences in driving behaviors, across Middle Eastern nations, including Saudi Arabia (Mansuri, Al-Zahrani & Qabshawi, 2015; Elvik, 2020).

To date, to the researcher's knowledge, no research has examined male-female the psychosocial sources of differences in risky driving behaviors, including road traffic accidents, in Saudi Arabia. As a result, the current study is important as it provides some of the only available evidence regarding male-female involvement in risky driving behaviors and automobile accidents and the contributing factors among Saudi Arabian youth drivers. This is a critical gap in the knowledge base regarding automobile accidents among Saudi Arabians for the following two reasons: first, the available literature that has analyzed data from Saudi Arabia has not been able to focus on female drivers as they were only recently granted the right to drive (only since 24 June 2018), and second, to the researcher's knowledge, there have not been any self-report studies that have focused on individual-level motivations and attributes that might contribute to risky driving behaviors and automobile accidents among males and females that might explain male-female differences in these driving behaviors. According to Bates et al. (2014) and Elvik (2010), (1) young drivers are five to ten times more likely to experience injuries as a result of road crashes when compared to drivers among the safest age group, and (2) that young males have a higher crash rate than young females.

Against this backdrop, the current study is designed to examine whether there are psychosocial, cultural and environmental bases for the differences between males and females in risky driving behaviors and automobile accidents in a sample drawn from college students in the Kingdom of Saudi Arabia (KSA). A sample from this population in the Kingdome of Saudi Arabia provides a unique source for examining these issues for the following reasons: First, the limited or rather non-existent knowledge available on this topic in the KSA and, Second, the high rate of traffic accidents resulting from risky driving behaviors in this region of the world. Recent data, for instance, show that the overall rate of non-fatal traffic accidents in KSA is 20.7 per 100 persons annually (Mansouri, Al-Zahrani & Qabshawi, 2015). In addition, the World Health Organization has estimated that there are approximately nine traffic-related deaths in the KSA per 10,000 vehicles (WHO Report, 2010). Moreover, fatal traffic accidents are exceedingly high with approximately 4.7 percent of all deaths annually being attributable to automobile accident fatalities. According to Ansari et al. (2000), overall, traffic accidents exert a tremendous economic toll on the KSA, with estimates being more than 21 billion SAR (approximately 5,569,786,650.00 US $) annually. Whether these rates might change because of females driving remains to be determined.

Therefore, this current study seeks to fill this gap in the literature by analyzing a unique sample drawn from the KSA to explore male-female differences more fully in road traffic accidents, risky driving behaviors, and that might contribute to moving violations in the KSA. To address these issues, the researcher analyzed data drawn from fulltime male and female college students enrolled in a large university in the KSA.

Theoretical Framework:

Risky driving behaviors can be considered as some form of abnormal behavior and deviance. This is because such behaviors go against the norms, rules, regulations and constitute danger to drivers themselves as well as to others. The causes of such risky behaviors could be the result of one or more of various sources (e.g. personal, social, economic, or environmental). It is very important, therefore, to discuss the possible theoretical explanations of such risky behaviors in the study sample in order to better develop effective tools to combat such behaviors.
First: Psychological Approaches:

- According to **Freud's analytical approach**, deviance is an indication of the lack of proper development of the "superego" which is known to be the aspect that maintains the balance between the need for achieving pleasure and adherence to societal norms and regulations (Baker, 1981).
- **Self-Control Theory**: which considers that lack of self-control as the main factor in the development of deviant behavior. Self-Control refers to the ability to forego acts that provide immediate or near-term pleasures, but that also have negative consequences for the actor, and as the ability to act in favor of longer-

term interests (Gottfredson, 2017). Lack of self-control can be attributed to ineffective parental patterns especially before the age of ten thus leading to weak, damaged or absent social relations. This theory asserts that children who enjoy effective and healthy parental patterns before the age of ten develop strong self-control and develop trusting and healthy social relations (Hirschi and Gottfredson, 1993; Muraven, Pogaresky, & Snek 1994, and Gottfredson & Hirschi, 2006). According to this theory, there are four types of social relations. They are as follows: (1) Attachment between the individual and the society, (2) commitment which leads to contribution to the society, (3) integration and involvement in the society's legal activities, and (4) Implicit shared beliefs between the individual and the society (Macionis & Gerber 2010).

- **Personality Disorders:** The Diagnostic Statistical Manual (DSM-V, 2013) provides several explanations for youth deviant behaviors through several personality disorders such:

    - Posttraumatic stress disorder (PTSD), which may occur in the case of children survivors from physical, mental, emotional, or sexual abuse as well as survivors of wars (p. 215 - 265). PTSD has been found to lead to violence and suicide among war veterans as the official site of the United States' Veterans' Affairs department suggests that 26% of veterans suffer from Acute PTSD, 26% suffer from acute depression, and 48% suffer from both disorders together. https://www.ptsd.va.gov/professional/treat/cooccurring/suicide_ptsd.asp (accessed 24 January 2024).
    - Disruptive, Impulse-Control and Conduct Disorders which include antisocial personality, conduct, intermittent explosive and oppositional defiant disorders among others (DSM-V, 2013). It is worth noting that the oppositional defiant disorder affects children and teenagers and is characterized by three main types of symptoms: (1) angry/irritable mood, (2) argumentative/defiant behavior, and (3) vindictiveness (P. 462). The Antisocial Behavior Disorders affect more men than women with a ratio of 3:1, with males being more violent, and the violent behavior is more repetitive and starting at earlier age than girls (Alegria et al, 2013; Compton et al. 2005). With the prevalence of mental disorders in the world in general and consequently in Saudi Arabia, there is the likelihood that some of the risky behaviors in driving could be attributed to mental or personality disorders. The Saudi National Health & Stress Survey (2015) found that 40% of the age group 15-24 of the Saudi population is affected by some form of mental disorder which is similar to the age group 25-34 where both are the highest among all other age groups. This level is also the second highest in the world after the U.S. where mental disorders affect 52% of the same population. Another alarming finding is that 80% of those affected with mental disorders do not seek treatment. This rate is higher than the world's mental health prevalence rate which indicates that one in every four of the world's population suffers from one mental disorder (WHO, 2001). Al-Subaie, Al-Habeeb & Altwaijri (2020) asserted that such results could help greatly in policy development. New policy development could address mental health conditions for drivers to ensure that drivers do not constitute risk to themselves and to others. Zuckerman & Kuhlman, (2000) attributed problem behavior including risky driving patterns to personality processes and personality risk-taking resulting from common bio-social factors (Zuckerman & Kuhlman, 2000). Psychiatric/neurological and mental status (e.g. feelings, mood, thoughts, impulsivity, etc.) are found to be essential factors to the occurrence of car accidents (Cummings et al, 2001).

- **Life-cycle theories**: which include multiple theories (e.g. Moffitt's Theory of Delinquency, Farrington's Theory of Delinquent Development, and Sampson and Laub's Age Graded Theory) which all assert that the individual's adoption or resistance of deviant behavior differs in various life stages (e.g. childhood, adolescence, youthhood and adulthood). The age of adolescence and young adult is characterized by cognitive and social developments, transitions in life roles, stresses and coping mechanisms. According to both Erickson and Piaget, experience in this life stage can lead to success or failure. This makes this particular age group very vulnerable to being affected by peers, society and economic conditions. They also differ in the case of unemployment compared to an individual who is employed and, at the same time, satisfied with his/her employment. These theories put more emphasis on the social upbringing and the social environment of the individual than on the individual him/herself (Moffitt & Caspi, 2001; Laub, Sampson and Sweeten, 2008).

- **Elliott's Integrated Theory**: as described in (Elliott, Ageton & Canter, 1979) integrates the principles of Strain Theory (Morton, 1938 as reported in Aseltine, Gore & Gordon, 2000), Self-Control Theory & Social Learning Theory (Pandura, 1977). According to Pandura (1977), deviance is a learned behavior through observation, modeling, and imitation. According to the strain theory, the individual's behavior (normal or deviant) can be determined mainly by the individual's ability or failure to achieve objectives (financial, social, and professional) for example. Achieving objectives leads to a higher level of life satisfaction, adherence to policies and rules, and more support of such rules and policies. On the other hand, failure to achieve objectives can lead to resentment and deviance.

- **Cognitive Theory:** which proposes that changes in the environment affect the mode of thinking and the conclusions drawn thus leading to change in cognition and consequently a change in behavior. Learning occurs through three stages (1) attention, (2) Retention, and (3) Reproduction. In order for the new behavior to be sustained, it needs reinforcement from the society (DiGiuseppe, David & Venezia 2016).

- **Behavioral Theory:** which asserts that behavior changes as a result of the societal influence rather than from inside the individual's self. This behavioral approach suggests that behaviors (risky driving behaviors in this case) are the products of an array of factors. These factors may be related to the driver, the motor vehicle and road conditions, the community, and the degree of laws and regulations' enforcement. McKnight & McKnight (2004) found that inexperience and immaturity increase the rate of accidents among teen drivers (Bates et al. 2014; McKnight & McKnight 2019). Several studies highlighted the importance of factors such as the bio-physiological factors and the risk-taking behaviors as significant contributors to risky driving (Deery & Fields, 1999; Zuckerman & Kuhlman, 2000). Turner & McClure (2003) found that age and gender differences in risk taking behavior provide an explanation for the high rate of car accidents among young males.

Methods

Data

Data for this study come from a sample of undergraduate students attending a large university in Saudi Arabia during the 2017-2018 academic school year. Students were recruited across various colleges and departments at the university. Eligibility to participate in the study was limited to only full-time college students. Participants were informed that that study would focus on driving behaviors, that the survey could be completed within about 30 minutes, and that all participation was voluntary and uncompensated. The self-report surveys were developed in English, translated into Arabic, and then back translated into English to ensure that the meaning and content of the surveys did not change during the translation process. Overall, a total of 958 students (N = 808 males and N = 150 females) agreed to participate in the study and submitted surveys that had usable information.

Risky Driving Behavior Measures

Three unsafe driving behavior measures were included in this study. First, the short-form version of the Driving Anger Scale (DAS) was included (Deffenbacher, Oetting & Lynch, 1994) which is a 14-item scale that is designed to measure individual variation in driving anger. Respondents were asked to imagine different situations and then indicate the level of anger that it would cause them. For example, participants were asked to imagine situations such as someone maneuvering in and out of traffic, someone running a red light or stop sign, and being stuck in a traffic jam. They were then asked to rate their anger level, with responses being coded as follows: 1 = none at all, 2 = a little, 3 = some, 4 = much, and 5 = very much. The responses were then summed together to create a total driver anger score with higher values representing more driver anger (alpha = .79). Importantly, this scale has been shown to be reliable and to predict accidents, risky driving practices, and aggressive driving behaviors (Deffenbacher et al., 2000 & Deffenbacher et al. 2001).

Second, to measure involvement in risky driving practices, a fourteen-item risky driving behaviors scale was created in which respondents were asked specifically to indicate how often they engaged in fourteen different risky driving behaviors, such as driving fast just for the thrill of it, speeding up if someone is trying to pass, texting while driving,

and making rude gestures to other drivers. All of these items were coded as follows: 1 = never, 2 = hardly ever, 3 = sometimes, 4 = often, and 5 = very often. Responses to the fourteen items were summed together to create the risky driving behaviors scale (alpha = .81). Importantly, this scale has been used in previous research (Ivers et al., 2006; Ivers et al. 2009).

Third, a measure of lifetime accidents was included in the analyses. In this measure, respondents were asked to indicate the total number of minor and major road traffic accidents that they had been involved in during their lifetime. Responses to these items were summed to create a lifetime accidents measure. Table 1 includes descriptive statistics for this scale and all of the other measures employed in the analyses.

Table 1. Descriptive Statistics for Selected Add Health Study Variables

	Mean (Percentage)	SD	Min – Max
Driving anger	43.70	9.25	14 – 65
Risky driving behaviors	30.42	7.82	15 – 54
Accidents lifetime	2.36	2.16	0 – 9
Gender			
Male	(84.3)	---	0 – 1
Female	(15.7)		
Age	21.51	1.47	19 – 25
Marital status			
Married	(5.4)	---	0 – 1
Single	(94.6)		
Education level			
No college credit	(18.8)	---	0 – 1
College credit/degree	(81.2)		
Driver's license			
No	(9.4)	---	0 – 1
Yes	(90.6)		

Control Variables

To better understand the results, four control variables were included in the analyses. These variables are: first: age was included as a continuous variable that was measured as the age (in years) of each respondent, Second: education level was entered into all of the analyses and was measured dichotomously, such that 0 = no college credit earned and 1 = earned at least some college credit, third: marital status was included in the analyses (0 = single, 1 = married) and fourth: a single-item measure indicating whether the respondent currently has a driver's license was included in all of the analyses (0 = no driver's license and 1 = have a driver's license).

Plan of Analysis

The analysis for this study proceeded in two steps. First, t-tests were estimated to examine whether there were significant average differences between males and females for key variables and measures related to driving. Second, ordinary least squares (OLS) regression equations were utilized to examine male-female differences in lifetime traffic accidents. For this analysis, two models were estimated: a baseline model and a multivariate model. The baseline model estimated the association between gender (0 = female, 1 = male) and the outcome measure while only including the control variables. The second model was a multivariate model that introduced the remaining covariates, including the driving anger scale and the risky driving behaviors scale. Comparing the effects of the gender variable between the baseline model and the multivariate model should provide some insight into the nature of the association between gender and involvement in traffic accidents.

Results

The analysis began by examining male-female differences in some of the key driving behavior measures. Table 2 displays the results of these analyses which were estimated by conducting a series of independent sample t-tests. As demonstrated, males, in comparison with females, self-reported more involvement in risky driving behaviors, they reported more road traffic accidents, and they also were more likely to report having a driver's license. Surprisingly, there was not a significant difference between males and females on the driving anger scale, indicating that males and females reported about the same level of driving anger.

Table 2. Average Male-Female Differences on Risky Driving Measures

	Males	Females	t-value
Driving anger	43.54	44.68	-1.22
Risky driving behaviors	30.96	27.05	4.83*
Accidents lifetime	2.46	1.79	3.38*
Driver's license	0.91	0.41	11.83*

*$p < .05$, two-tailed test

As for the results of the multivariate models which predict lifetime accidents, table 3 contains the results of these models. The baseline model of this table includes the gender variable and the key control variables. As this model shows, the gender variable is a significant predictor of road traffic accidents, indicating that males had, on average, more road traffic accidents than females. The multivariate model of this table introduces a series of driving behavior measures to determine whether they may be able to explain the male-female difference in road traffic accidents. The results of this model show that while the driving anger scale and the driver's license scale were significantly associated with road traffic accidents, gender retained statistical significance. Stated differently, the driving behavior measures introduced in the multivariate model were unable to account for the male-female difference in lifetime road traffic accidents.

Table 3. Ordinary Least Squares Regression Models Predicting Lifetime Accidents for Males and Females

	Baseline Model			Multivariate Model		
	b	SE	Beta	b	SE	Beta

Gender	0.85	0.23	0.13*	0.58	0.28	0.09*
Driving anger				0.03	0.01	0.13*
Risky driving behaviors				0.01	0.01	0.05
Driver's license				0.86	0.26	0.13*
Marital Status	-0.98	0.35	-0.11*	-0.58	0.42	-0.06
Educational Level	-0.54	0.21	-0.09*	-0.65	0.23	-0.11*
Age	0.61	0.55	0.04	0.11	0.06	0.08
R-squared		0.05			0.08	
N		785			647	

*$p < .05$, two-tailed test

Discussion

A long line of research has revealed that males are significantly more likely to engage various forms of risky behaviors, ranging from serious violence to other more mundane forms of behaviors (Ellis, Beaver & Wright, 2009). To date, however, there has been a paucity of research examining whether risky driving behaviors in the KSA are significantly different for males and females and whether differential involvement in risky driving behaviors might account for male-female differences in road traffic accidents. The current study attempted to shed some light on these issues. Analysis of data drawn from a sample of males and females residing in the KSA produced two main findings.

First, and in line with previous research, the analyses revealed robust male-female differences in most of the risky driving measures. Specifically, males engaged in more risky driving behaviors and had more accidents in their lifetime than females. Surprisingly, there were not any differences between males and females in driving anger that led to being incarcerated or arrested. These differences were all statistically significant and quite large, at least by social science standards.

The second key finding to emerge from the analyses was that male-female differences in lifetime accidents were detected in the baseline model and even after introducing controls for risky driving behaviors and driving anger. These covariates included measures of some of the most consistent predictors of road traffic accidents. This is a particularly noteworthy finding and highlights just how robust the male-female differences were in the data.

The findings revealing significant male-female differences in certain driving behavior measures should be viewed cautiously owing to a few limitations. First, all of variables were based on retrospective self-reported data which leaves open the possibility of recall bias and social desirability factors. It would be interesting and important to replicate these analyses with data that included official crime measures. Second, the data were not based on nationally representative data which means the findings may not be generalized to other nations or even to other regions within the KSA. Last, only recently were females provided with the opportunity to drive in the KSA. Whether these findings will remain in the future is certainly an open-empirical question awaiting future research.

Conclusion and Recommendations

Women's driving in Saudi Arabia is a recent phenomenon compared to males' since women were allowed to drive for the first time in Country only starting from June 8, 2018. This can suggest variations in experience and familiarity with cars, roads and traffic laws which may affect the consequences of actions during driving. According to the ecological theory, personality characteristics and behaviors are not but one factor in a multifaceted and multileveled factors that combine to affect the style and outcome of individuals' driving. Of these factors are: (1) the social context (e.g. culture, neighborhood, family and peers), (2) individual characteristics: (e.g. self-control, knowledge, experience, etc.), (3) passengers in the company of the driver: (e.g. type, relationship, behaviors, interaction with the driver, etc.), (4) vehicle's characteristics: (e.g. age, condition, design, safety features, etc.), (5) policies, laws, and law enforcement, (6) educational and community interventions, and (7) transportation infrastructures (e.g. road conditions, traffic signs, speed limits, etc.). One of the goals in the Kingdom of Saudi Arabia Vision 2030 is to reduce the traffic accidents by 50% by the year 2030. Through regulation, imposing hefty fines for violations, and installing road cameras and monitoring systems, injuries and deaths due to traffic accidents have been reduced noticeably. According to the Ministry of Health of Saudi Arabia, deaths due to traffic accidents in 2019 were reported as follows: males: 5081 and females 673, while in 2020 the numbers were 4108 for males and 510 for females. As for injuries in 2019, the number of males were 27281, and 5629 for females, while in 2020 the number of injuries came down to 21492 for males and to 4069 for females. This indicates a slowing trend of traffic accidents that induced injuries and deaths. To improve the situation in a more significant way, a comprehensive approach that takes into consideration all the above-mentioned factors is needed. As for the individual factor(s), cognitive behavioral comprehensive approach related to driving is needed to start from early years in life through families, schools, media and social involvements. Driving behaviors should be tied to responsible citizenship and with legal consequences. Defensive driving courses and training should be made enforced as a requirement before granting permits to young drivers. Applicants for driver's license should pass a written test on the laws, signs, speed limits, substance use, safety measures, etc. before the practical driving test. For young drivers, the driving license may be granted gradually starting with a permit to drive in the presence of fully licensed driver for a period of six months before being granted the full license to drive with the condition of driving in certain hours avoiding late nights and limiting the number of occupants in the car. As for the cognitive part, awareness campaigns should work on ensuring knowledge and awareness of traffic laws, consequences of traffic accidents particularly resulting in deaths and disabilities, importance of values and behaviors such as patience, not insisting on one's right to the road, self-control and anger-control would help to a great extent in improving the personal characteristics as well as responsible citizenship qualities. Such interventions can be offered through schools, driving schools, department of transportation, department of traffic *(Muroor),* media including social media and law enforcements. It can be also carried out in the forms of preventive educational and extracurricular programs. Finally, more studies are needed perhaps to examine the relationship between other factors such as those related to the society, the environment, the type of companions while driving, the automobile conditions and the health condition of drivers and risky behaviors, and /or traffic accidents.

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